

# Building Materials and Systems.

## An Evaluation on the Production and Use of Building Materials



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## Objectives / Criteria for Evaluation

- **Cost efficiency**
  - **affordable** (*without sacrificing durability and building standards*)
- **Environment friendly**
  - **less energy consumption** (*minimize use of electric fans & air-conditioning eqpmt.*)
  - **healthy living space**
- **Develop local economy**
  - **skill & enterprise development**

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## Areas for Evaluation

- **Building Materials Used**
  - Availability of local materials
  - Energy consumption for processing
- **Building Structure**
  - Posts and beams (frame structure)
  - Box structure

## Areas for Evaluation

- **Construction Methods**
  - Manpower requirement
  - Equipment and tools needed for installation
- **Solar Responsive Building**
  - Orientation
  - Daylighting
  - Heat control

# Energy Consumption for Processing

Building Material	kWh/m <sup>3</sup>	kWh/kg
Cement		1
Aluminum (sheets)	195 000	72.5
PVC	12 800	9.5
Steel (plates)	6 100	7.7
Solid Bricks	1 140	
Timber	600	
Concrete	500	
Earth Blocks	0 - 250	

(Gernot MINKE, 1986)

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# Maximum use of local materials

- adobe



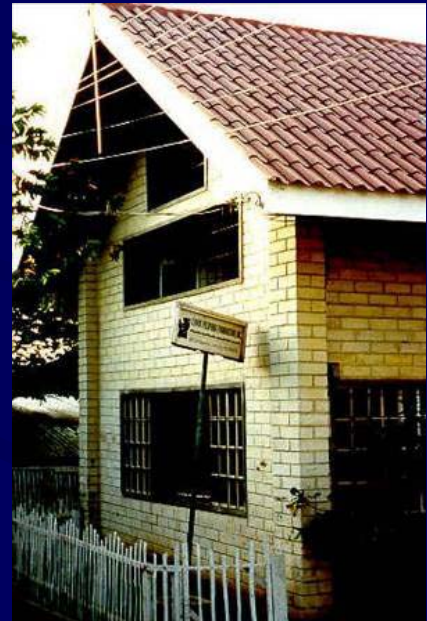
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# Use of local materials

- compressed earth blocks



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# Use of local materials

- compressed interlocking earth blocks



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## Use of local materials

- concrete interlocking blocks



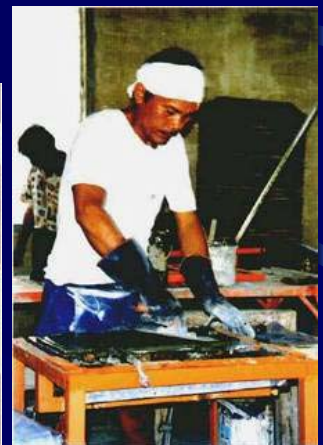
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## Minimizing energy used on transportation

- decentralization of production units
- encourages local production (enterprise development)



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# Building Structures

- Posts and Beams



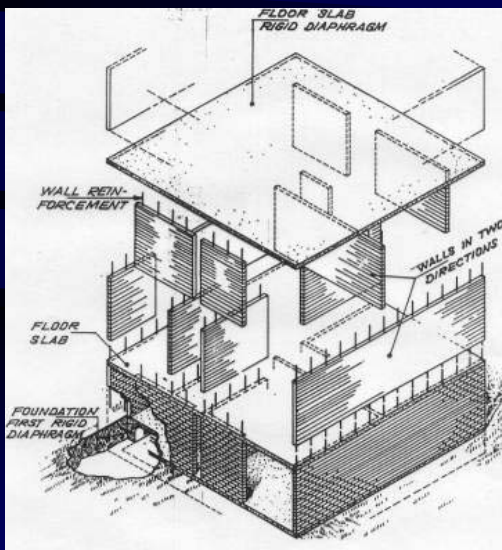
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# Building Structures

- Box Structure



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# Building Structures

- **Box Structure**



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# Building Structures

- **Box Structure vs. Posts with In-filled Walls**



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# Construction Methods Used

- **Manpower requirement**



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# Construction Methods Used

- **Need for tools and equipment**



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# Building in Stages

- **Building in Phases**



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## Critical Indicators Determining Sustainability of Building Technologies

<b>Ecological</b>	<b>Social</b>	<b>Technological</b>	<b>Financial</b>
Energy	Employment	Cost	Investment per job
Fuel consumption	Skills	Strength	Investment per energy unit
Material movement	Local economy component	Productivity of labor	Productivity of capital
Local resources	Community participation	Maintenance	Investment per unit
Resources imported			Maintenance cost

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# CONCLUSION

- **Research and development**
  - **Cost-efficient building materials**
  - **Appropriate building structure**
  - **Appropriate construction method**
- **Documentation of best (*and “bad”*) practices**
- **Sharing of experiences**

**‘til we meet  
again!**